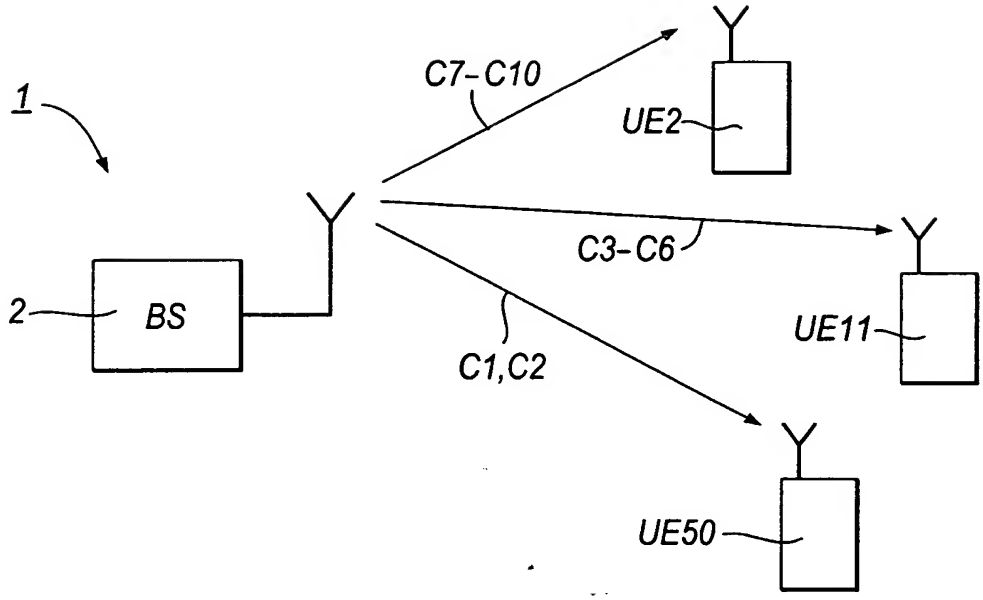

Fig.1

	TTI 1	TTI 2	TTI 3	TTI 4	TTI 5	TTI 6	TTI 7	TTI 8	TTI 9
Node B 1 Channel Code 1	UE50 Packet 1	UE1 Packet 1	UE3 Packet 1	UE23 Packet 1	UE4 Packet 2	UE6 Packet 1	UE1 Packet 1	UE23 Packet 1	UE7 Packet 1
Node B 1 Channel Code 2	UE50 Packet 2	UE50 Packet 3	UE4 Packet 1	UE1 Packet 2	UE7 Packet 1	UE50 Packet 2	UE4 Packet 1	UE1 Packet 2	UE17 Packet 1
Node B 1 Channel Code 3	UE11 Packet 1	UE50 Packet 4	UE1 Packet 1	UE4 Packet 2	UE23 Packet 2	UE2 Packet 8	UE11 Packet 4	UE15 Packet 1	UE23 Packet 2
Node B 1 Channel Code 4	UE11 Packet 2	UE50 Packet 5	UE50 Packet 10	UE11 Packet 8	UE16 Packet 2	UE9 Packet 2	UE40 Packet 2	UE34 Packet 1	UE9 Packet 3
Node B 1 Channel Code 5	UE11 Packet 3	UE2 Packet 5	UE16 Packet 1	UE9 Packet 1	UE11 Packet 3	UE24 Packet 2	UE43 Packet 2	UE16 Packet 1	UE11 Packet 10
Node B 1 Channel Code 6	UE11 Packet 4	UE11 Packet 5	UE2 Packet 6	UE1 Packet 3	UE4 Packet 1	UE11 Packet 9	UE40 Packet 3	UE11 Packet 5	UE4 Packet 1
Node B 1 Channel Code 7	UE2 Packet 1	UE50 Packet 6	UE50 Packet 11	UE3 Packet 2	UE24 Packet 1	UE2 Packet 8	UE38 Packet 1	UE38 Packet 5	UE50 Packet 14
Node B 1 Channel Code 8	UE2 Packet 2	UE50 Packet 7	UE50 Packet 12	UE11 Packet 9	UE43 Packet 1	UE4 Packet 3	UE38 Packet 2	UE3 Packet 2	UE14 Packet 1
Node B 1 Channel Code 9	UE2 Packet 3	UE50 Packet 8	UE11 Packet 6	UE40 Packet 1	UE50 Packet 13	UE3 Packet 1	UE38 Packet 3	UE40 Packet 1	UE43 Packet 2
Node B 1 Channel Code 10	UE2 Packet 4	UE50 Packet 9	UE11 Packet 7	UE50 Packet 13	UE2 Packet 7	UE43 Packet 2	UE38 Packet 4	UE50 Packet 14	UE2 Packet 9

Fig.2

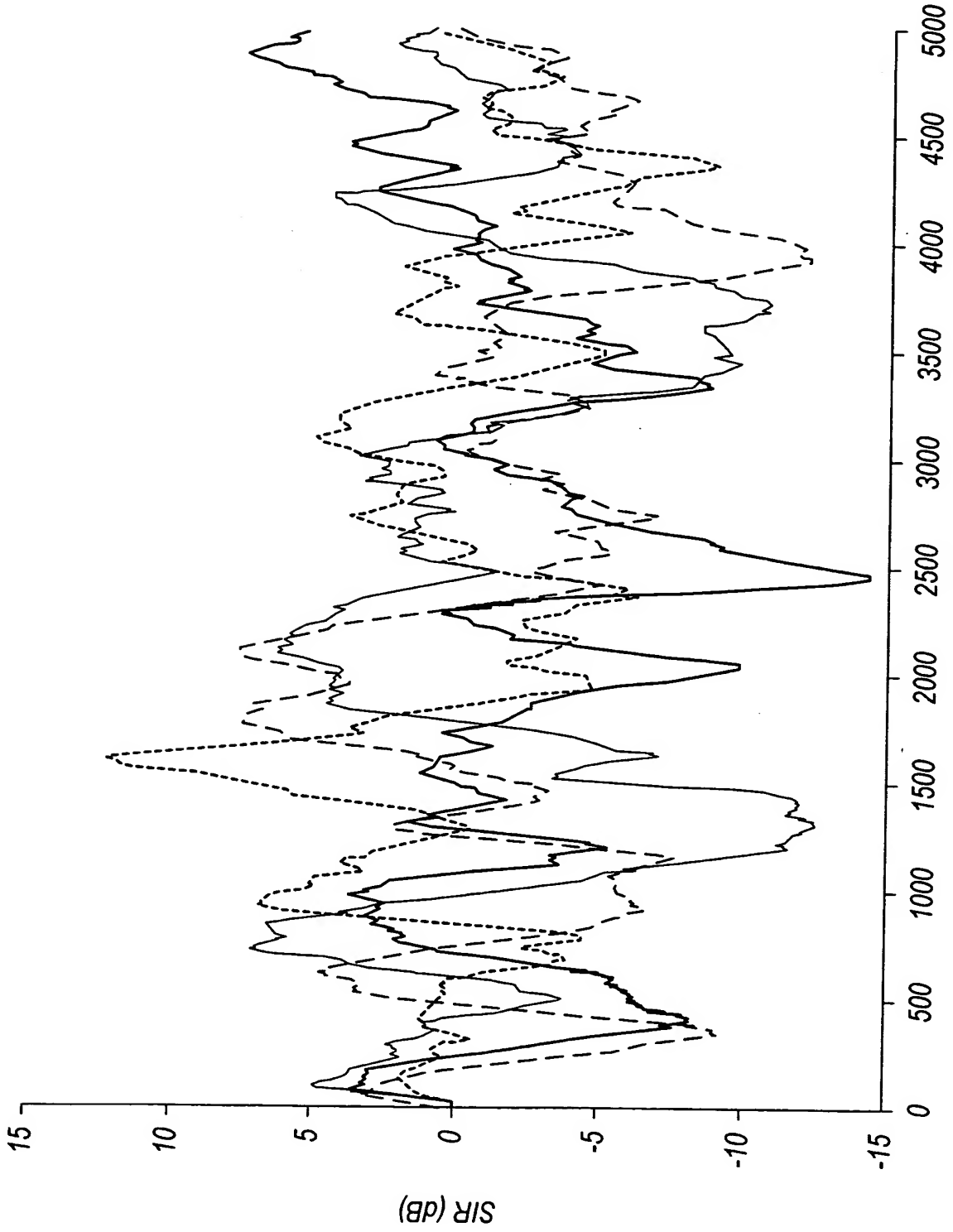
15
10
5
0
-5
-10
-15
SIR (dB)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
TTI

Fig.3

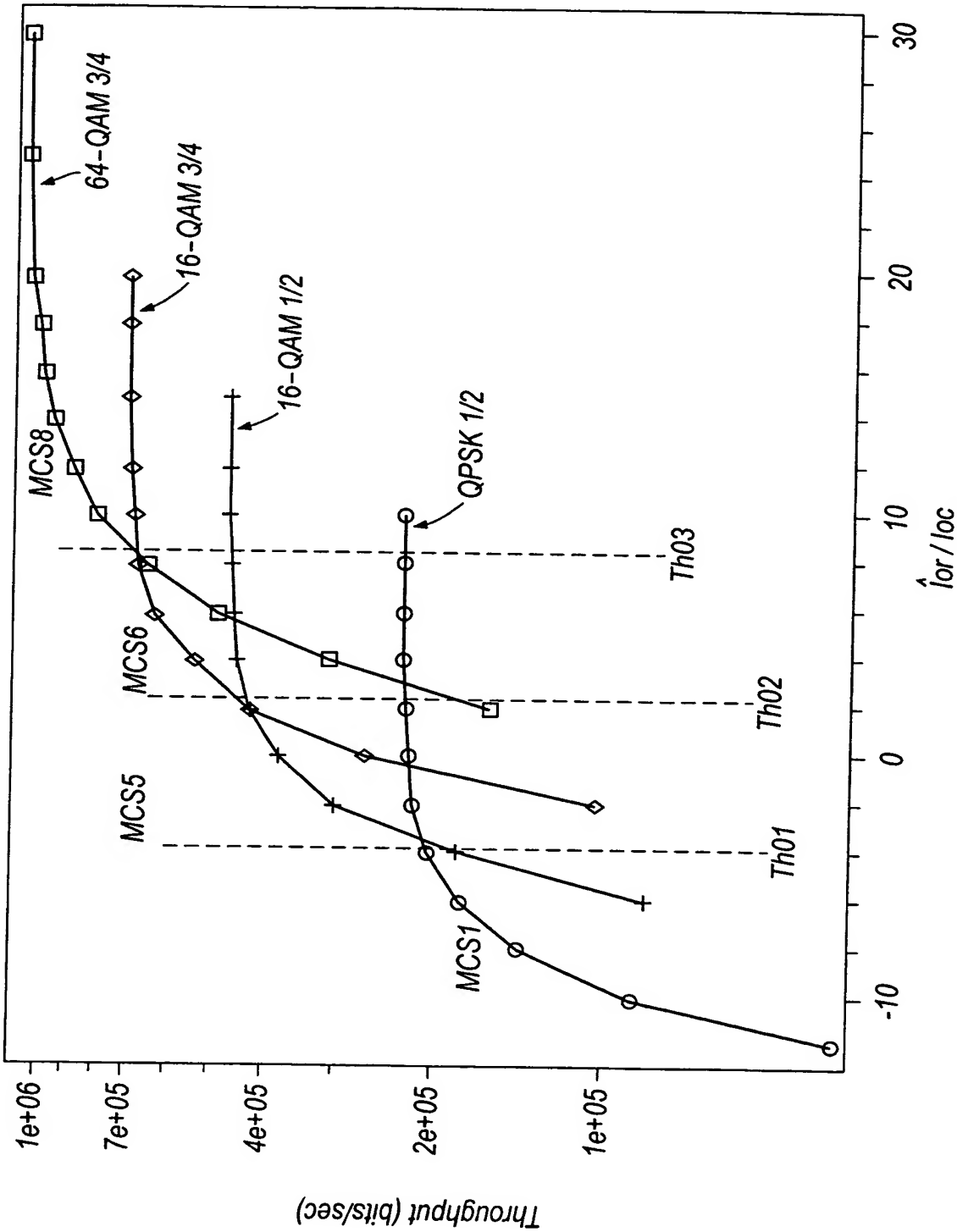
Throughput (bits/sec)
1e+06
7e+05
4e+05
2e+05
1e+05
-10
0
10
20
30
Îor / Ioc
64-QAM 3/4
16-QAM 3/4
16-QAM 1/2
QPSK 1/2
MCS8
MCS6
MCS5
MCS1
Th03
Th02
Th01

Fig.4

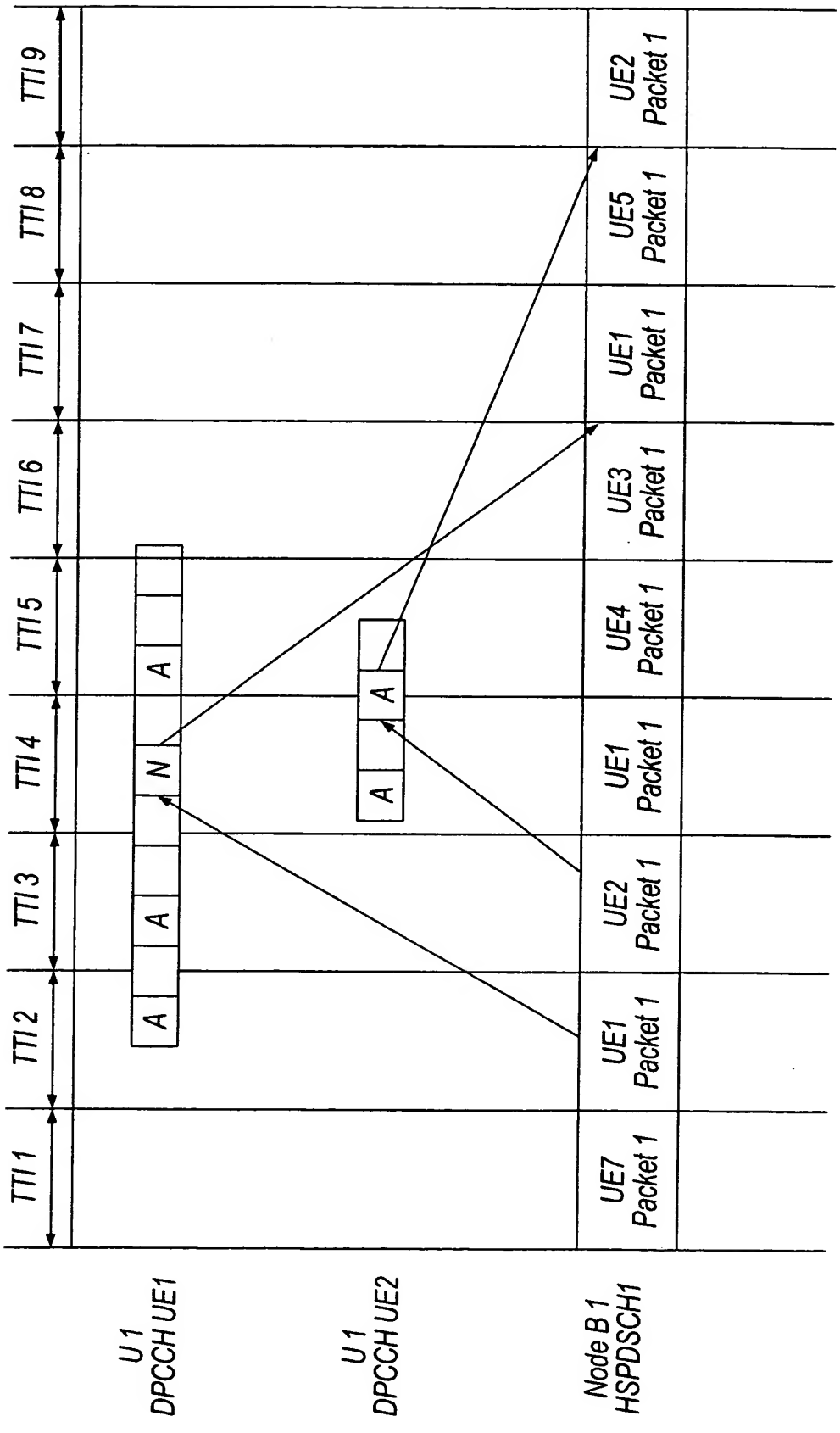
TTI 1
TTI 2
TTI 3
TTI 4
TTI 5
TTI 6
TTI 7
TTI 8
TTI 9
UE7 Packet 1
UE1 Packet 1
UE2 Packet 1
UE1 Packet 1
UE4 Packet 1
UE3 Packet 1
UE1 Packet 1
UE5 Packet 1
UE2 Packet 1
A
A
N
A
A
A
U 1 DPCCH UE1
U 1 DPCCH UE2
Node B 1 HSPDSCH1

Fig.5

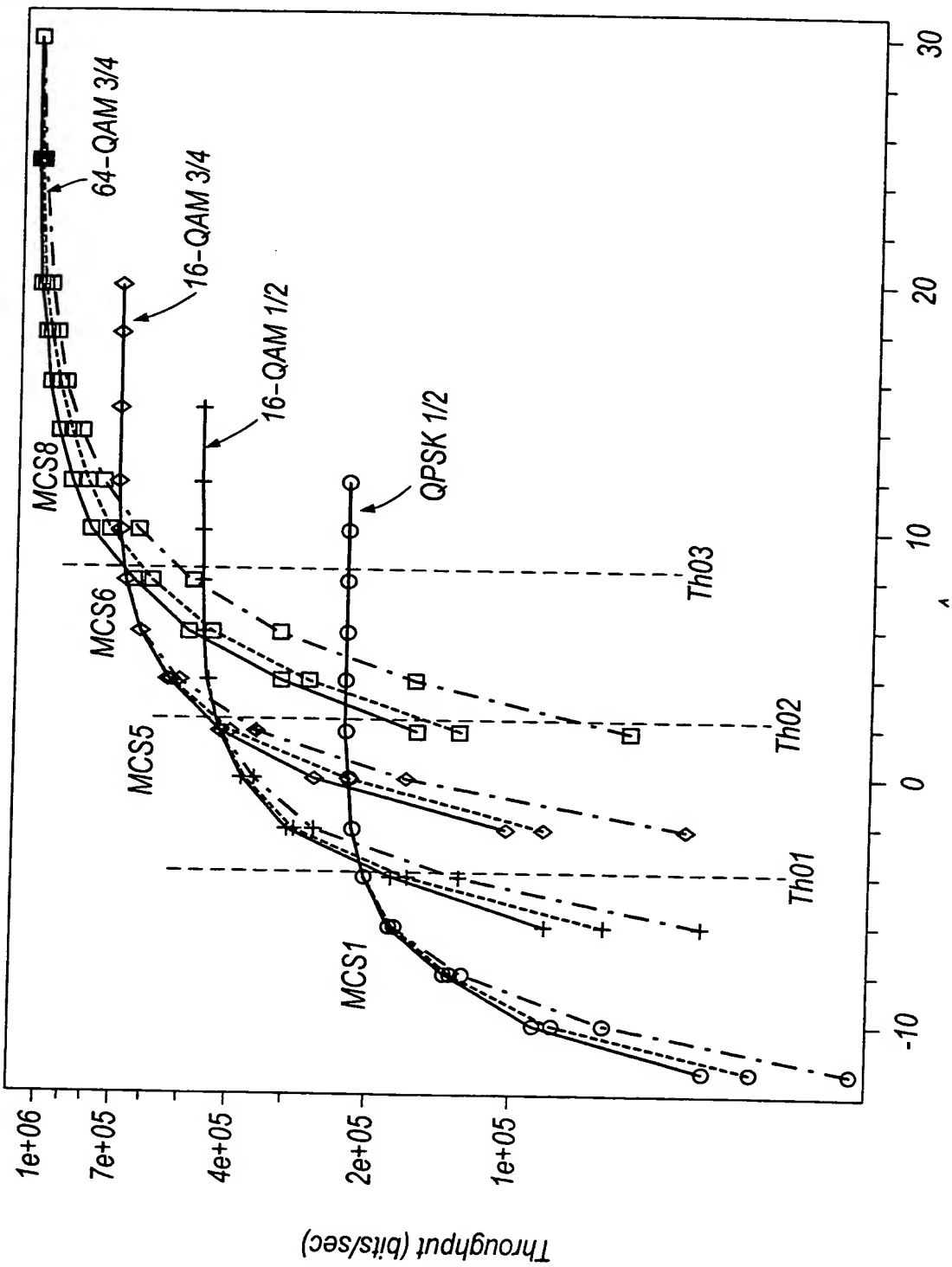
Throughput (bits/sec)
1e+06
7e+05
4e+05
2e+05
1e+05
-10
0
10
20
30
Îor / Ioc
64-QAM 3/4
16-QAM 3/4
16-QAM 1/2
QPSK 1/2
MCS8
MCS6
MCS5
MCS1
Th03
Th02
Th01

Fig.6

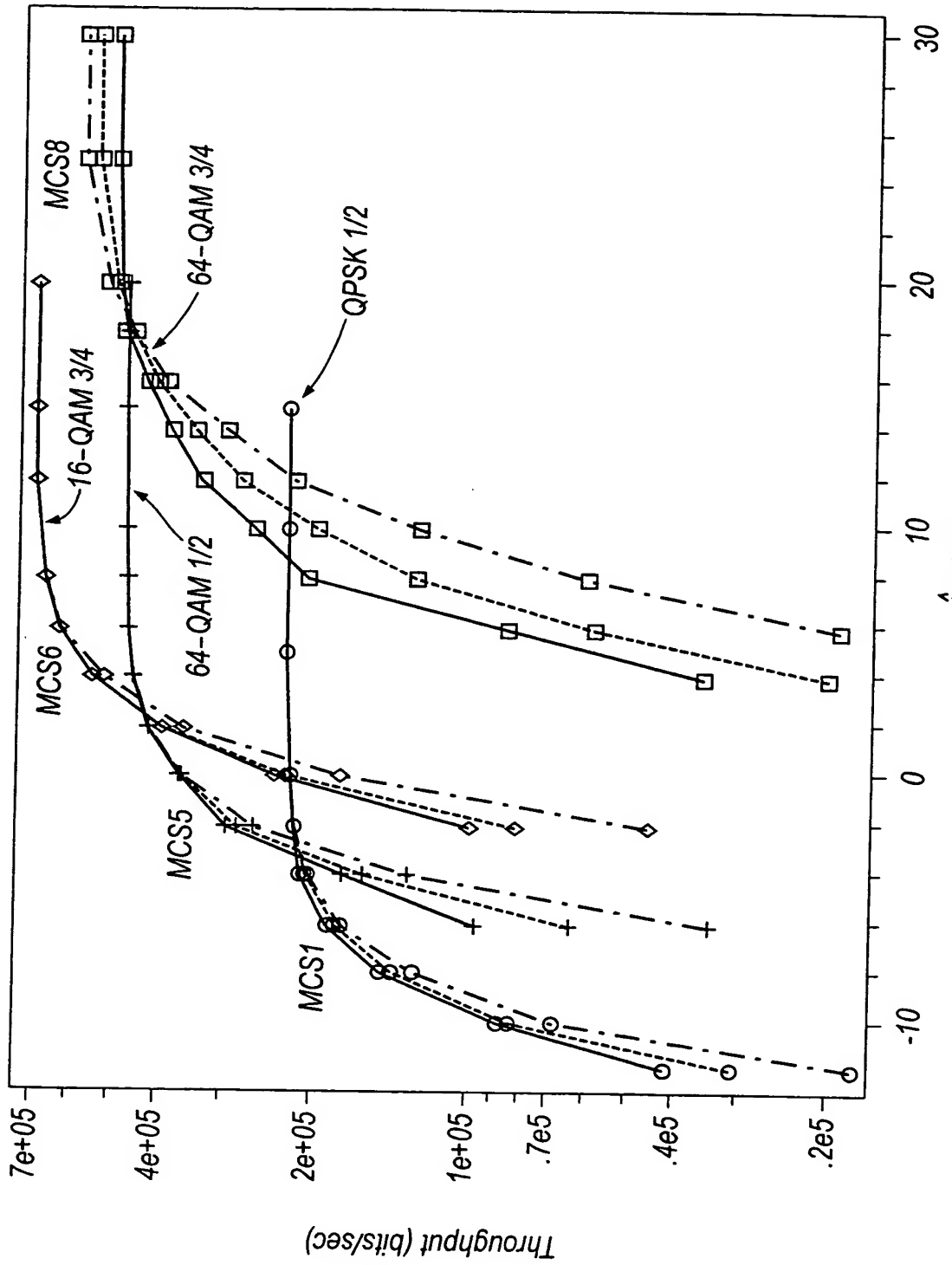
Throughput (bits/sec)
7e+05
4e+05
2e+05
1e+05
.7e5
.4e5
.2e5
-10
0
10
20
30
Îor / Ioc
MCS8
MCS6
MCS5
MCS1
16-QAM 3/4
64-QAM 3/4
64-QAM 1/2
QPSK 1/2

Fig.7

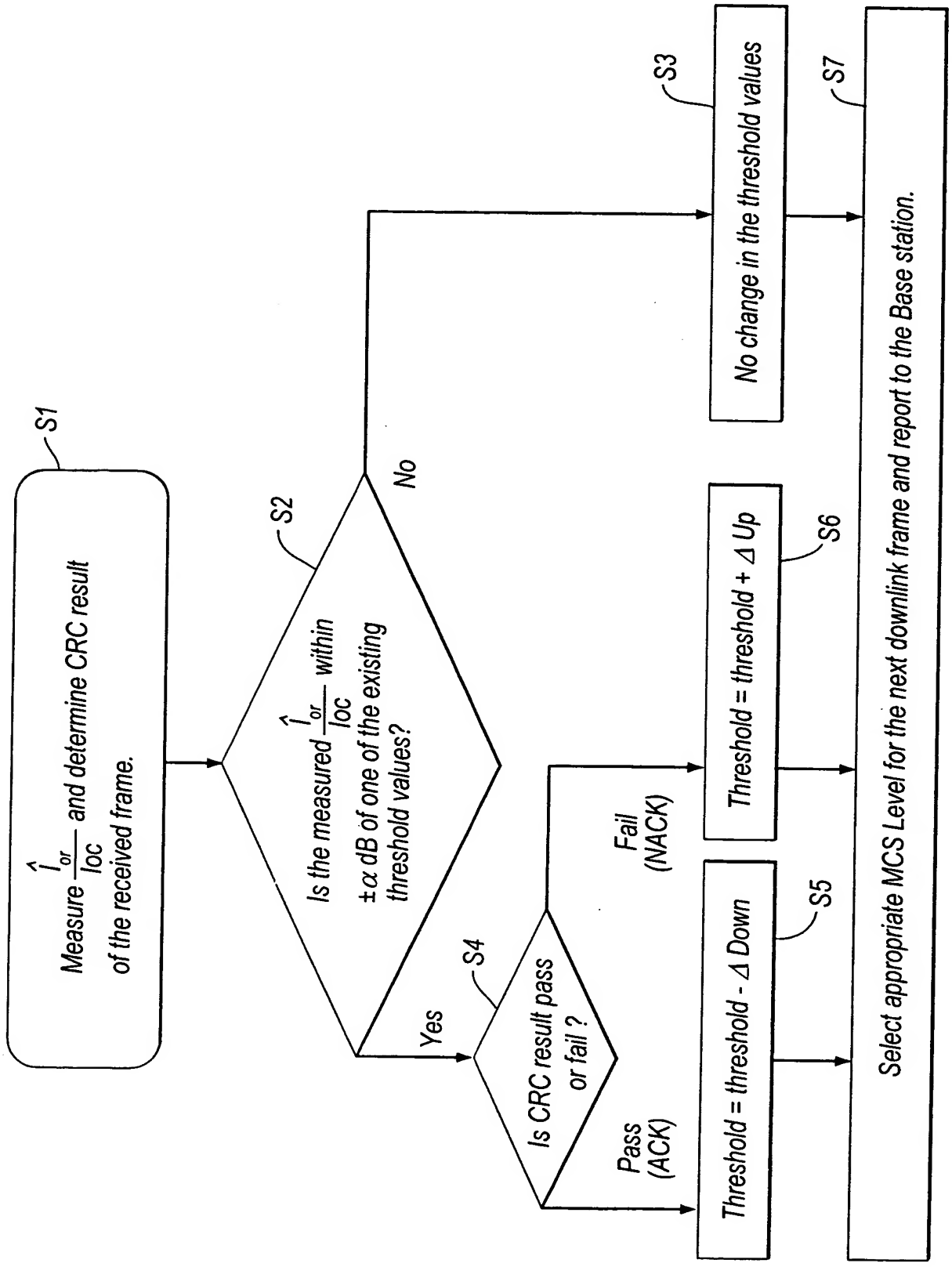
S1
Measure $\hat{I}_{or}/Ioc$ and determine CRC result of the received frame.
S2
Is the measured $\hat{I}_{or}/Ioc$ within ±α dB of one of the existing threshold values?
No
S3
No change in the threshold values
Yes
S4
Is CRC result pass or fail ?
Pass (ACK)
Threshold = threshold - Δ Down
S5
Fail (NACK)
Threshold = threshold + Δ Up
S6
S7
Select appropriate MCS Level for the next downlink frame and report to the Base station.

Fig.8

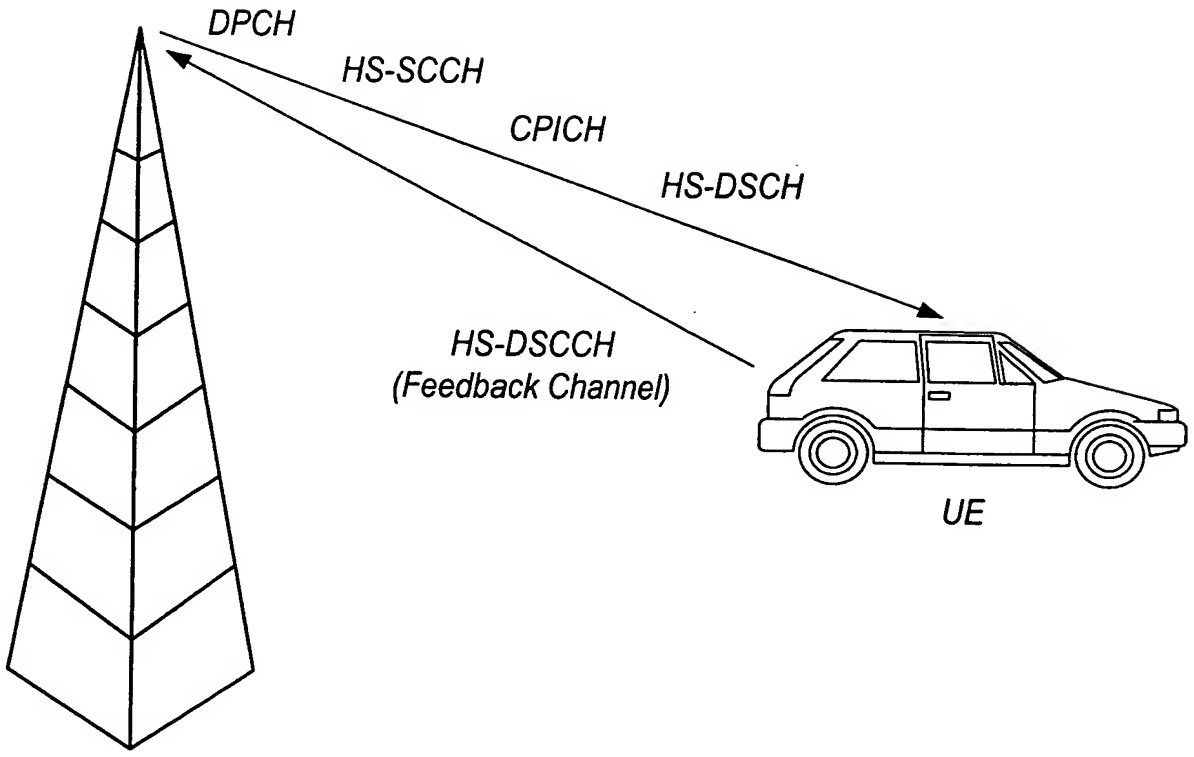
DPCH
HS-SCCH
CPICH
HS-DSCH
HS-DSCCH
(Feedback Channel)
UE
Target NodeB

Fig.9

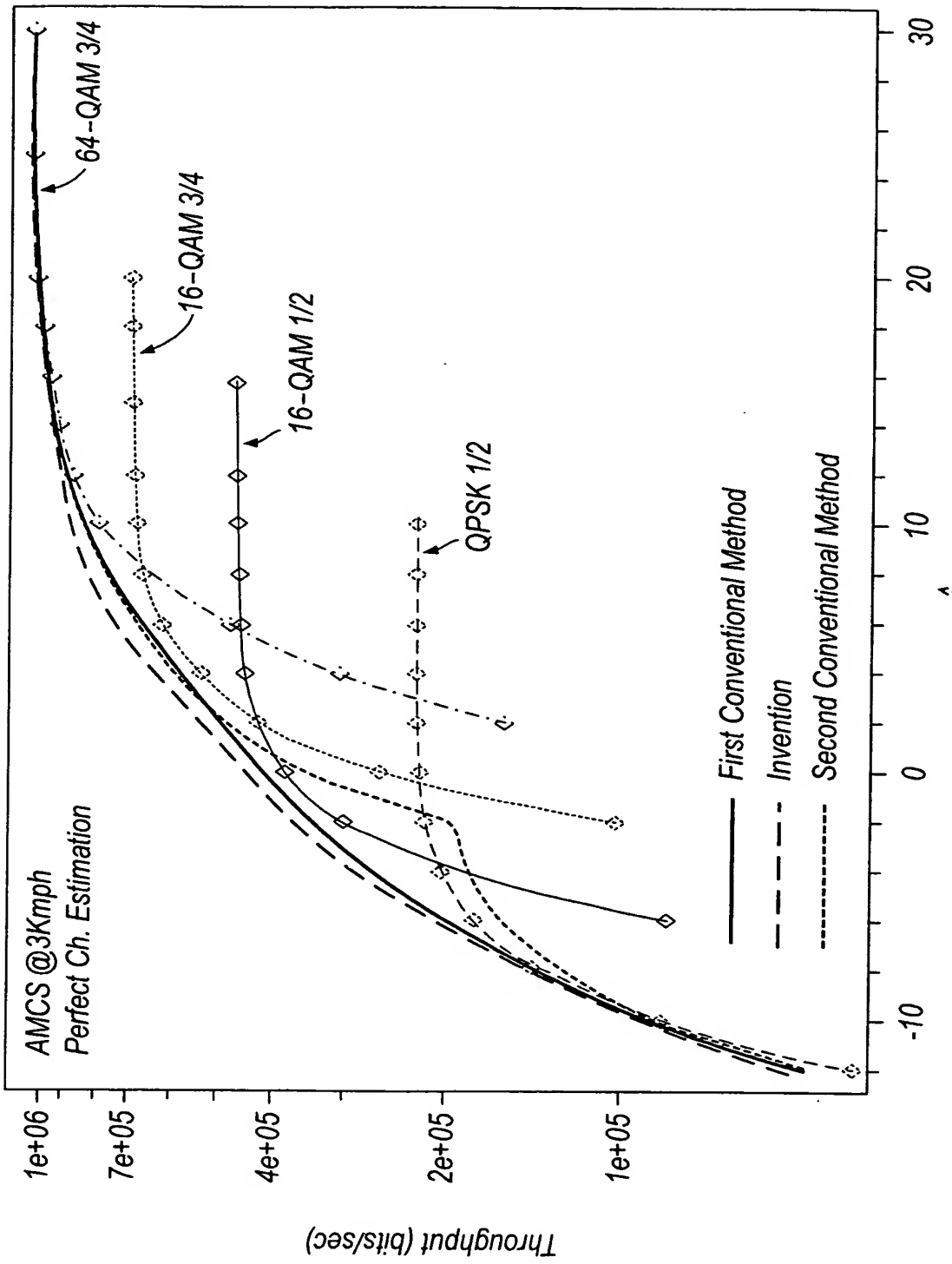
AMCS @3Kmph
Perfect Ch. Estimation
64-QAM 3/4
16-QAM 3/4
16-QAM 1/2
QPSK 1/2
First Conventional Method
Invention
Second Conventional Method
Throughput (bits/sec)
1e+06
7e+05
4e+05
2e+05
1e+05
-10
0
10
20
30
Îor / Ioc

Fig.10

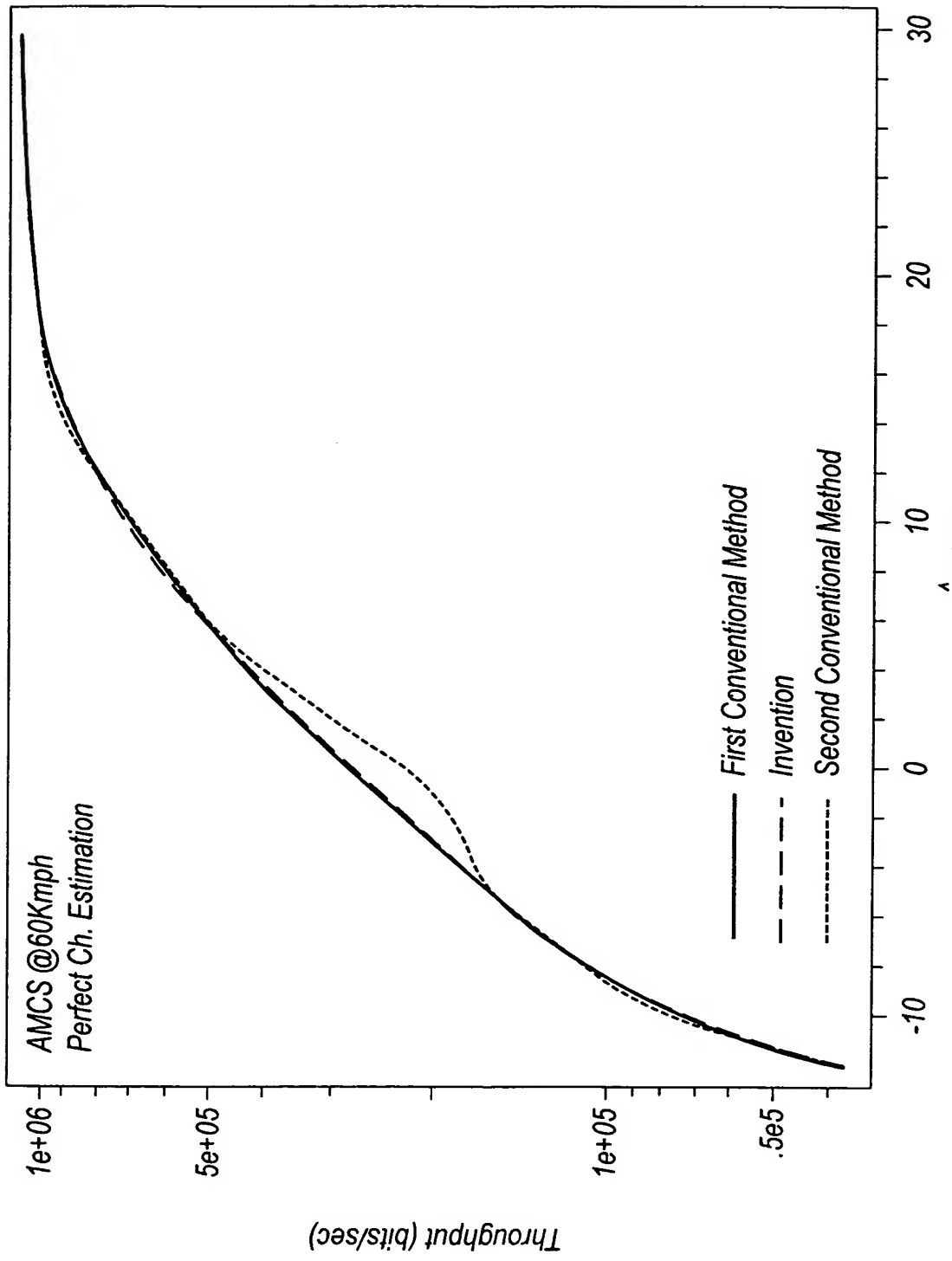
AMCS @60Kmph
Perfect Ch. Estimation
First Conventional Method
Invention
Second Conventional Method
Throughput (bits/sec)
1e+06
5e+05
1e+05
.5e5
-10
0
10
20
30
Îor / Ioc

Fig.11

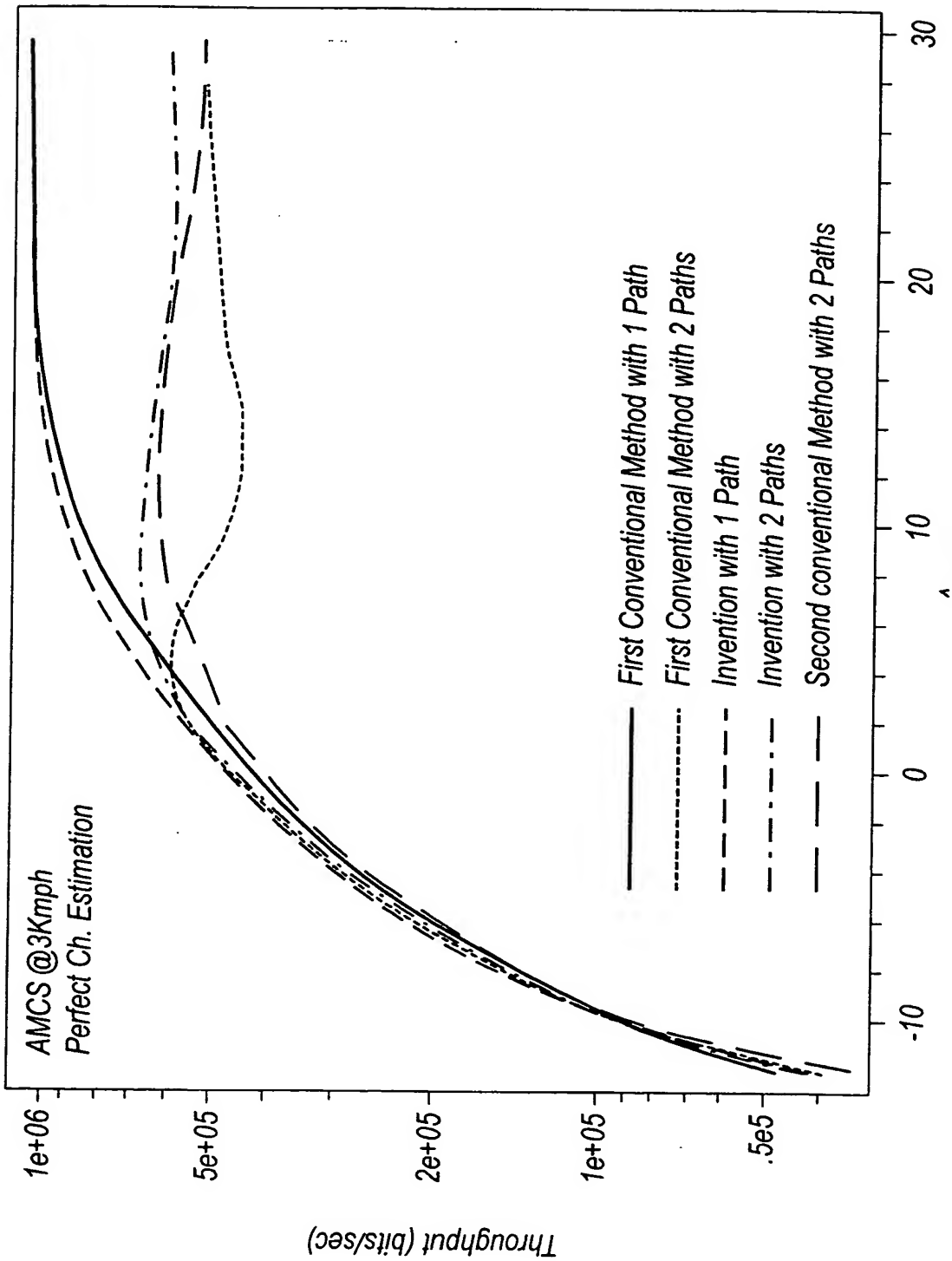
AMCS @3Kmph
Perfect Ch. Estimation
Throughput (bits/sec)
1e+06
5e+05
2e+05
1e+05
.5e5
-10
0
10
20
30
Îor / Ioc
First Conventional Method with 1 Path
First Conventional Method with 2 Paths
Invention with 1 Path
Invention with 2 Paths
Second conventional Method with 2 Paths

Fig.12

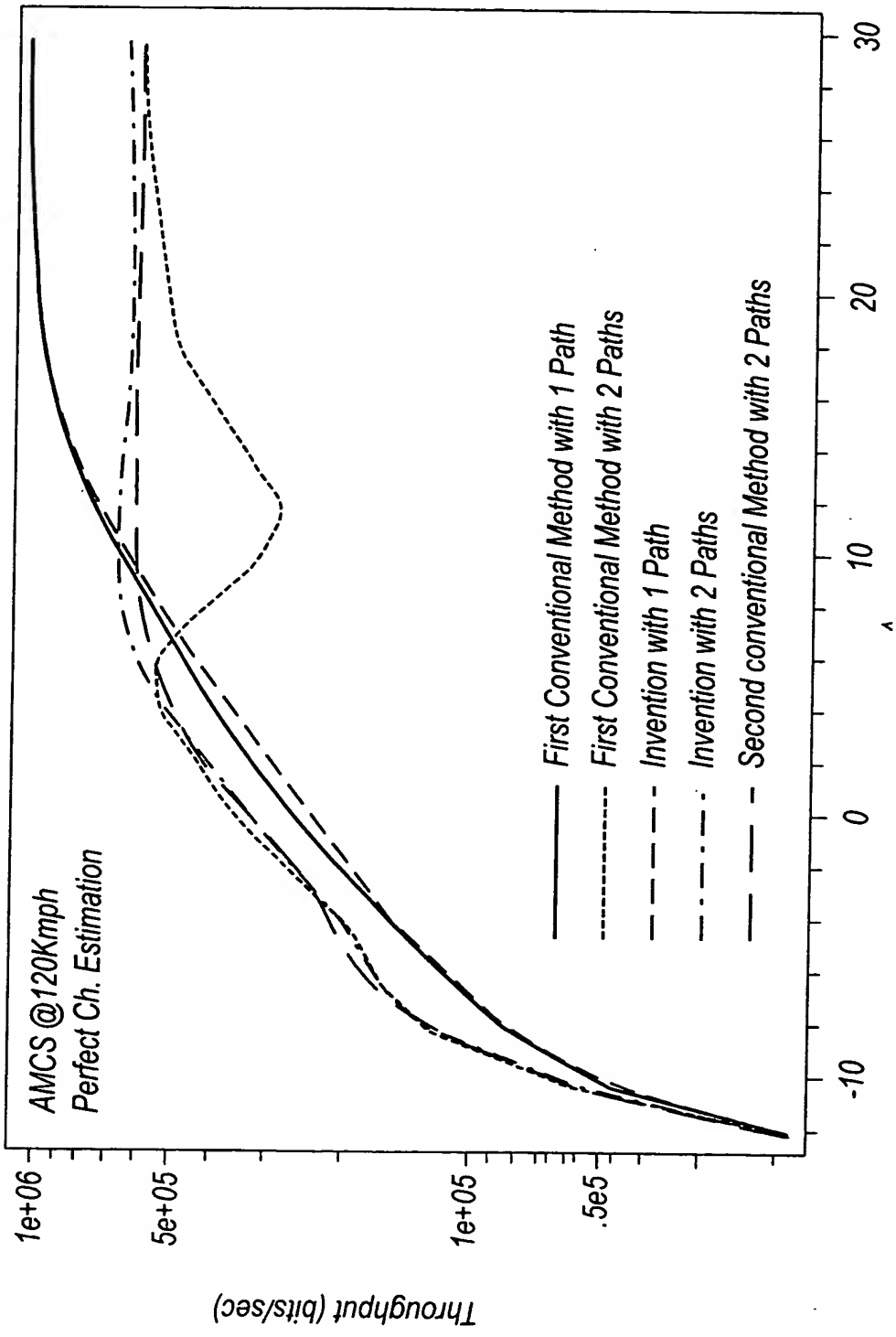
AMCS @120Kmph
Perfect Ch. Estimation
Throughput (bits/sec)
1e+06
5e+05
1e+05
.5e5
-10
0
10
20
30
Îor / Ioc
First Conventional Method with 1 Path
First Conventional Method with 2 Paths
Invention with 1 Path
Invention with 2 Paths
Second conventional Method with 2 Paths

Fig.13

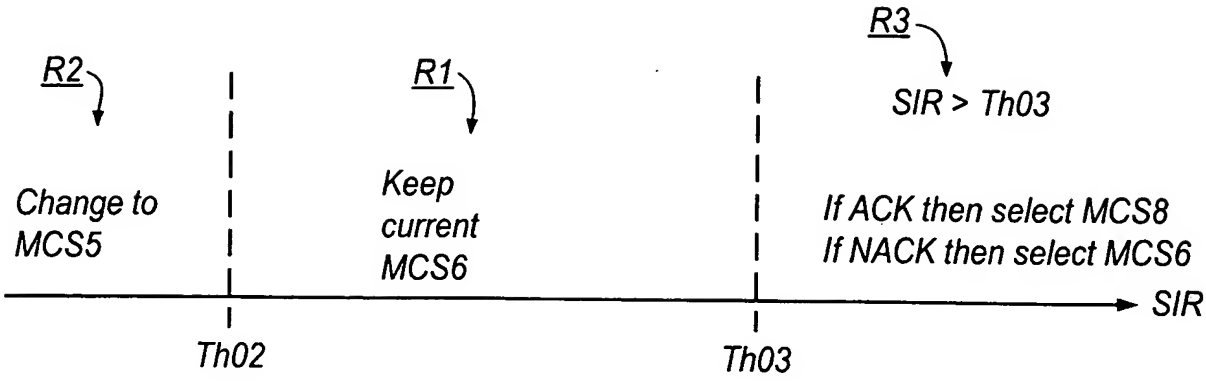

Fig.14

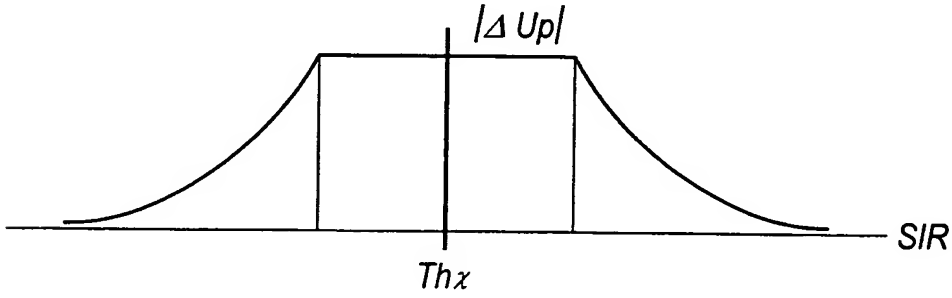

Fig.15(A)

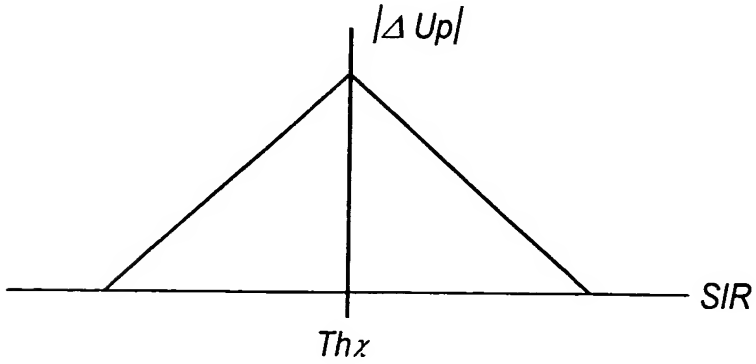

Fig.15(B)

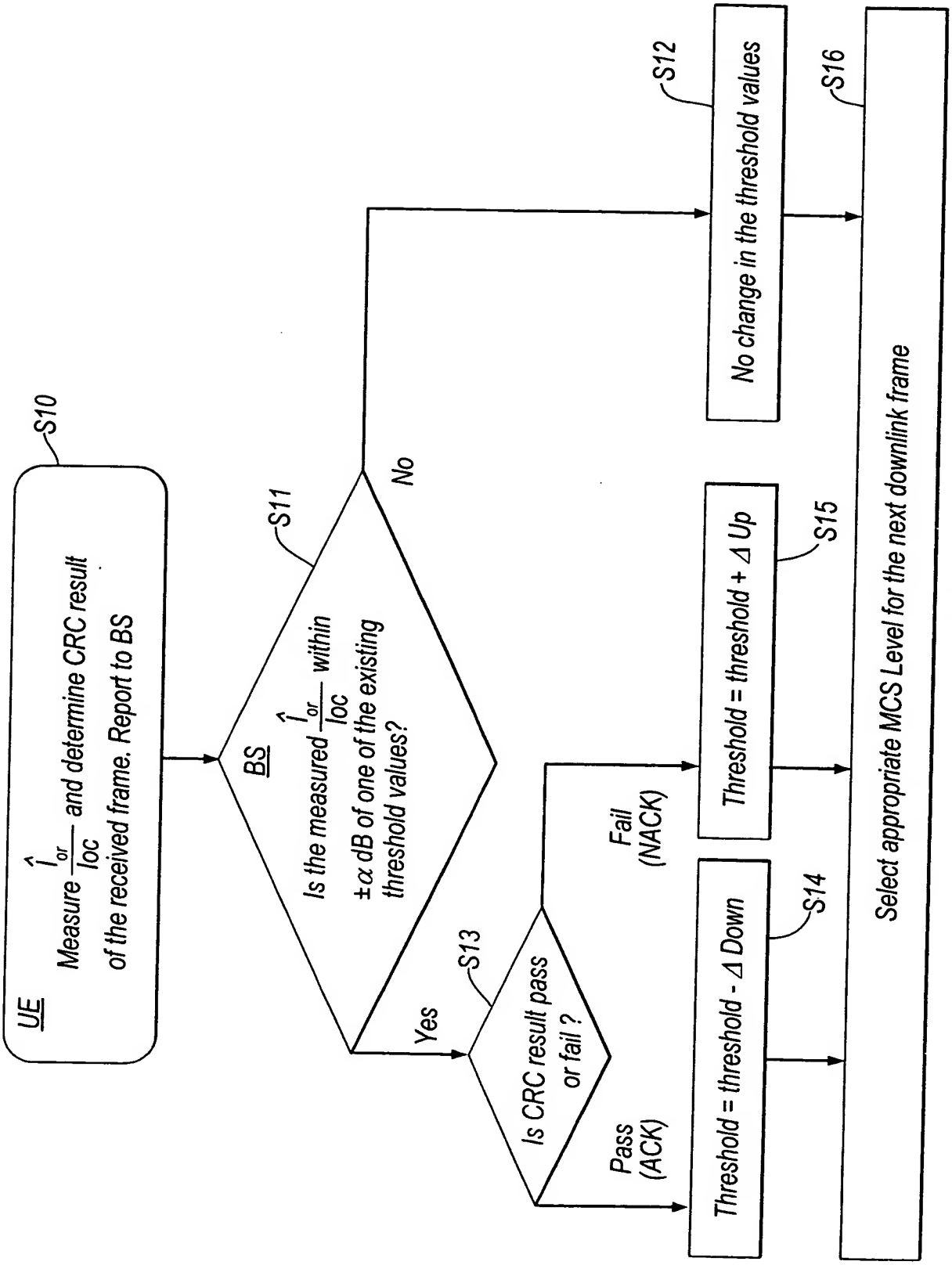
UE
Measure $\hat{I}_{or}/Ioc$ and determine CRC result of the received frame. Report to BS
S10
BS
Is the measured $\hat{I}_{or}/Ioc$ within ±α dB of one of the existing threshold values?
S11
No
Yes
S12
No change in the threshold values
S13
Is CRC result pass or fail ?
Pass (ACK)
Fail (NACK)
Threshold = threshold - Δ Down
S14
Threshold = threshold + Δ Up
S15
S16
Select appropriate MCS Level for the next downlink frame

Fig.16

MCS Number	1	2	3	4	5	6	7	8
Modulation Scheme	**QPSK**	**QPSK**	**8PSK**	**8PSK**	**16QAM**	**16QAM**	**64QAM**	**64QAM**
Spreading Factor SF	16	16	16	16	16	16	16	16
Symbols/slot	160	160	160	160	160	160	160	160
Bits/slot	320	320	480	480	640	640	960	960
TTI (ms)	2	2	2	2	2	2	2	2
Number Of slots/frame	3	3	3	3	3	3	3	3
Bits/frame	960	960	1440	1440	1920	1920	2880	2880
TPC,TFCI and Pilot	0	0	0	0	0	0	0	0
Code Length RF	960	960	1440	1440	1920	1920	2880	2880
Padding	0	2	0	2	0	2	0	2
Code Length RM (Rate*DataLength + Tail bit)	960	958	1440	1438	1920	1918	2880	2878
Rate (selected rates)	**Rate 1/2**	**Rate 3/4**	**Rate 1/2**	**Rate 3/4**	**Rate 1/2**	**Rate 3/4**	**Rate 1/2**	**Rate 3/4**
Code Length (3*DataLength + 4*(k-1)	1443	2154	2163	3234	2883	4314	4323	6474
K-1	3	3	3	3	3	3	3	3
Data Length	477	714	717	1074	957	1434	1437	2154
CRC Length	24	24	24	24	24	24	24	24
InfoData Length	453	690	693	1050	933	1410	1413	2130
InfoData Rate	226.5 Kbps	345 Kbps	346.5 Kbps	525 Kbps	466.5 Kbps	705 Kbps	706.5 Kbps	1065 Kbps
Number of Multicodes	10	10	10	10	10	10	10	10
Data Rate x Multicodes	2.265 Mbps	3.450 Mbps	3.465 Mbps	5.250 Mbps	4.665 Mbps	7.050 Mbps	7.065 Mbps	10.650 Mbps

Fig.17

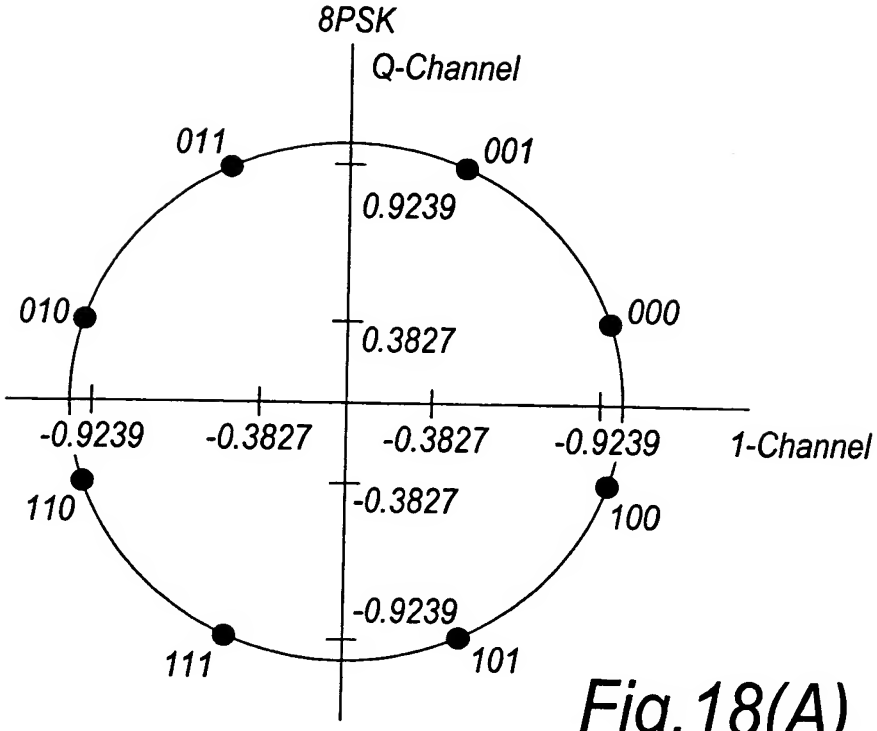

Fig.18(A)

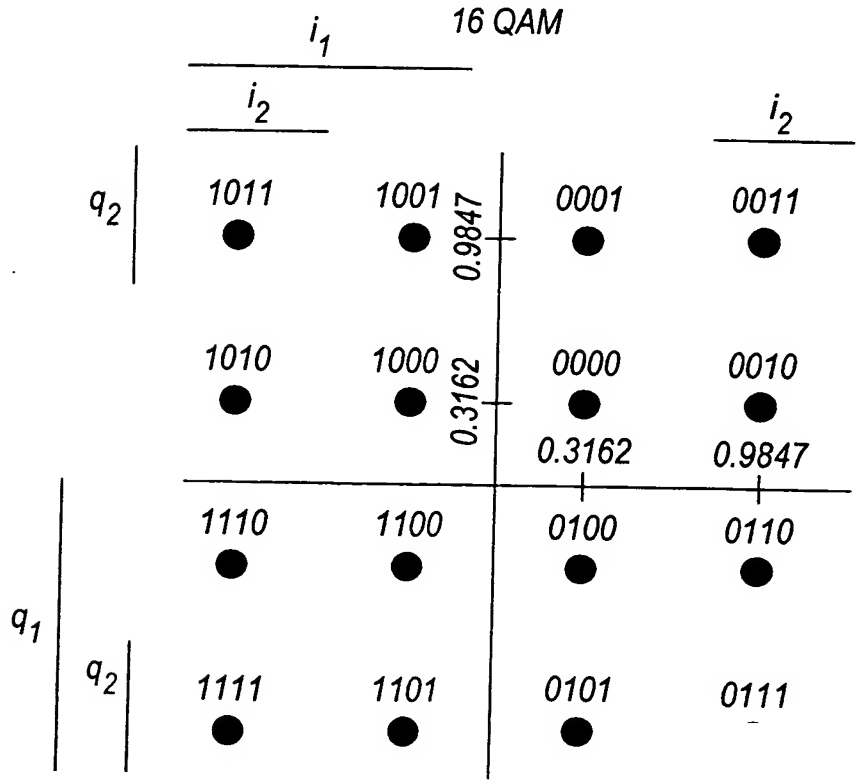

Fig.18(B)

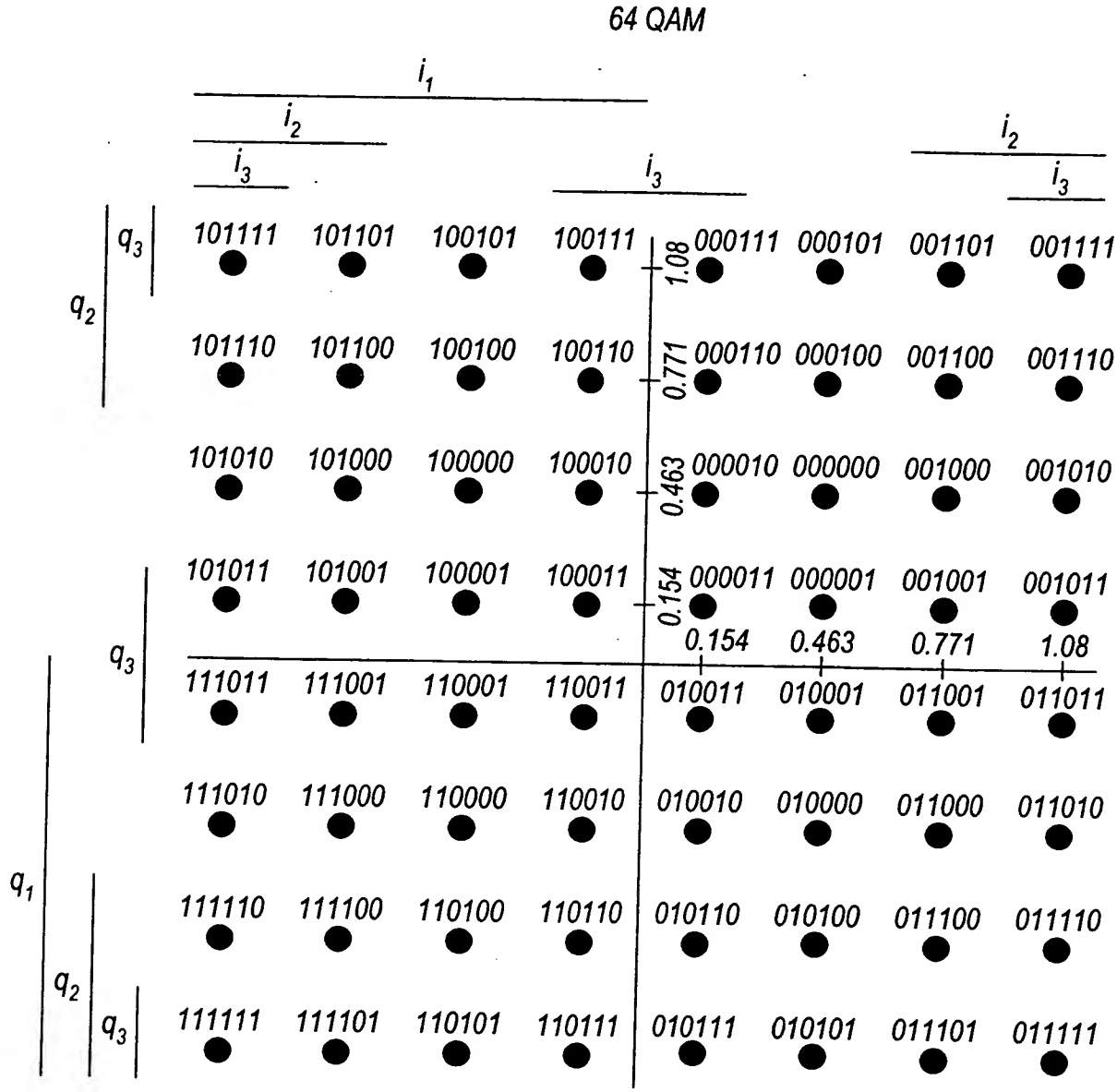
64 QAM
i_1
i_2
i_3
q_1
q_2
q_3
101111 101101 100101 100111 000111 000101 001101 001111
101110 101100 100100 100110 000110 000100 001100 001110
101010 101000 100000 100010 000010 000000 001000 001010
101011 101001 100001 100011 000011 000001 001001 001011
111011 111001 110001 110011 010011 010001 011001 011011
111010 111000 110000 110010 010010 010000 011000 011010
111110 111100 110100 110110 010110 010100 011100 011110
111111 111101 110101 110111 010111 010101 011101 011111
1.08
0.771
0.463
0.154
0.154 0.463 0.771 1.08

Fig.18(C)